



**British  
Geological Survey**

NATURAL ENVIRONMENT RESEARCH COUNCIL

Applied geoscience for our  
changing Earth

# The Challenges of Drought Prediction, Communication and Impact assessment

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14<sup>th</sup> June 2012

# What are droughts?

- Surface water, groundwater, agricultural
- How well are they understood by hydrologists/hydrogeologists/meteorologists? Is there a common understanding?
- How well are they understood by decision makers, industry, public?
- How are they inter-related in time and space
- What are the effects on societies, socio-economically, health impacts?



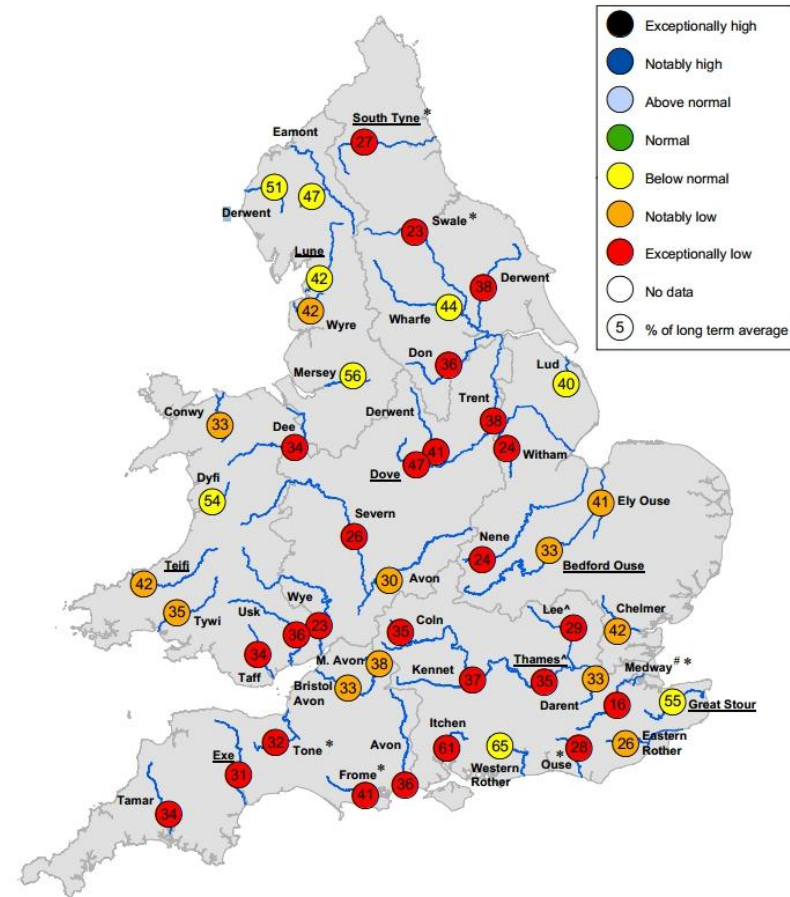
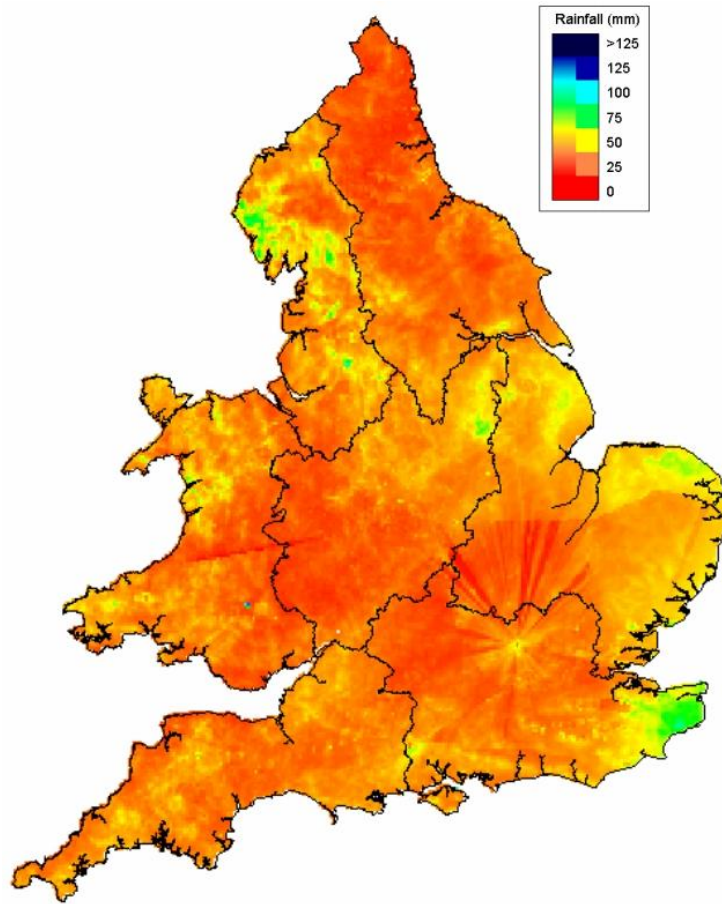
# Drought and water security



Can we as scientists answer this question?

How will climate change affect the frequency of drought conditions and loss of water supplies and biological diversity?

# UK drought situation Spring 2012



Total rainfall across England and Wales for March 2012. MOSES (Met Office Surface Exchange Scheme)

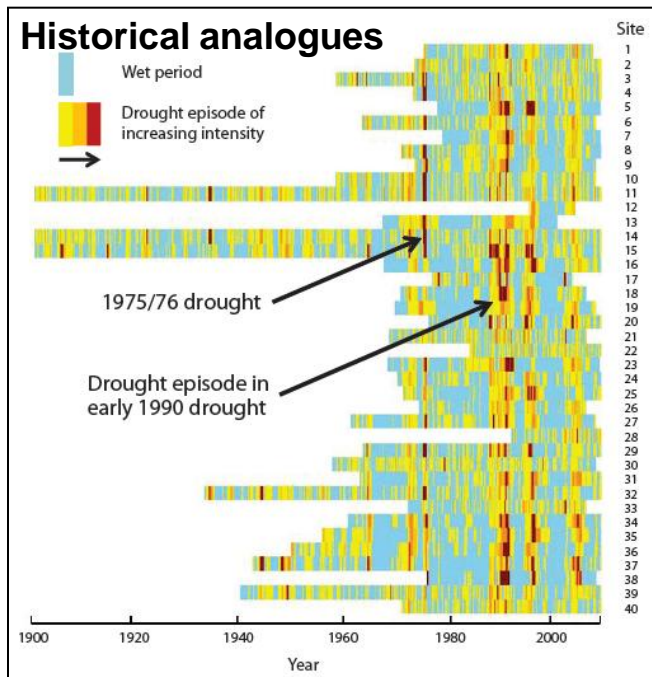
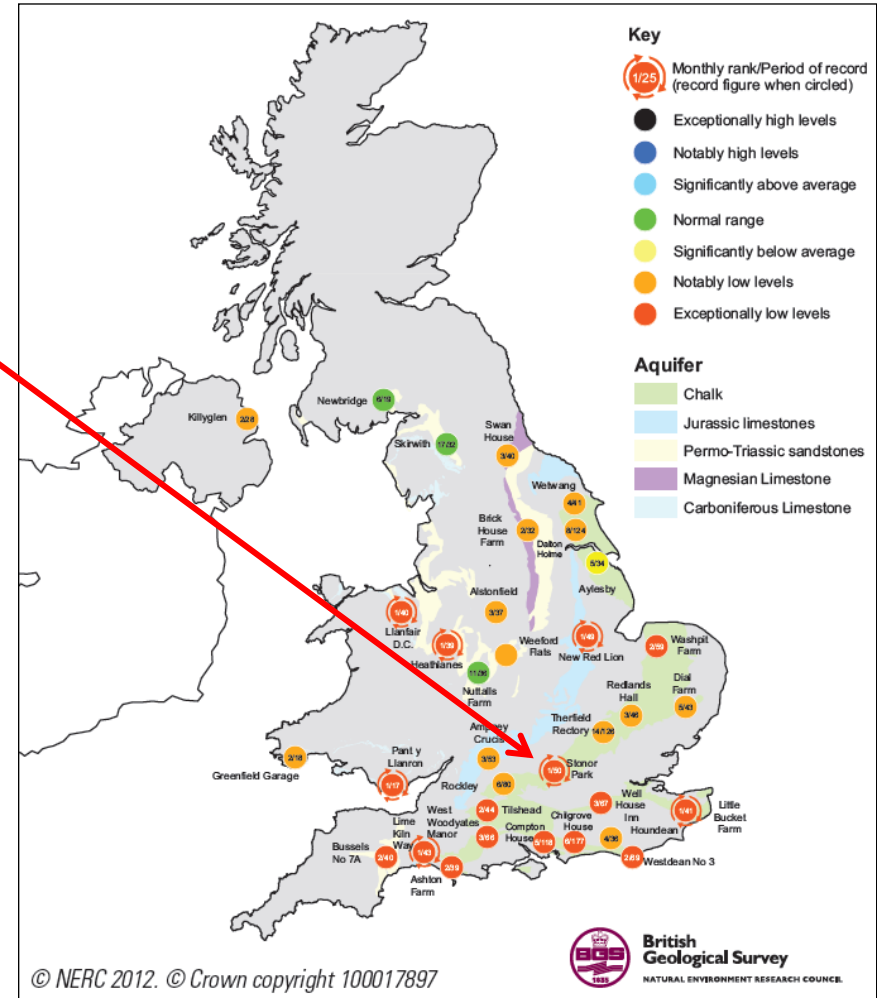
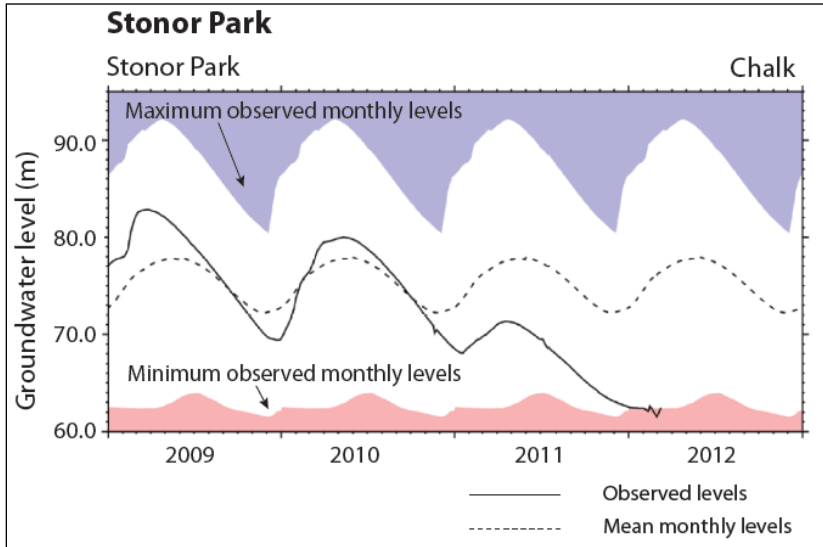
Monthly mean river flow March 2012, as % of long term average (Source: Environment Agency)

Can we go from here to seasonal prediction – yes?

Is the information useful? – what is useful and for whom

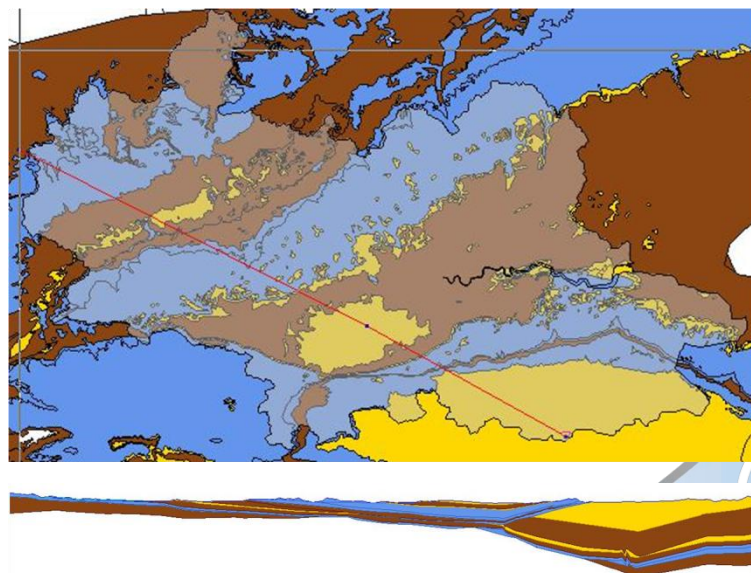
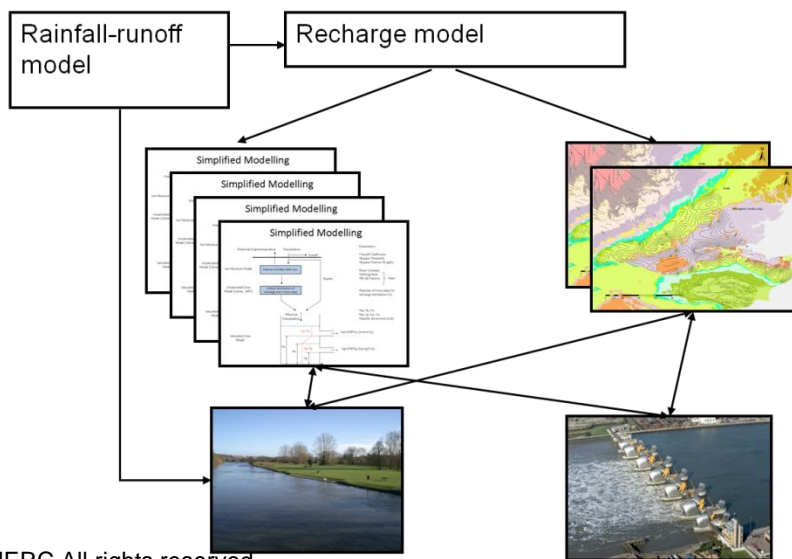
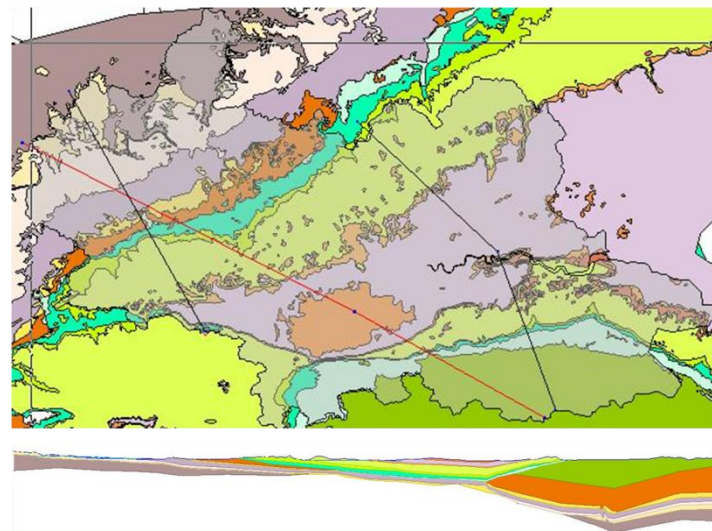
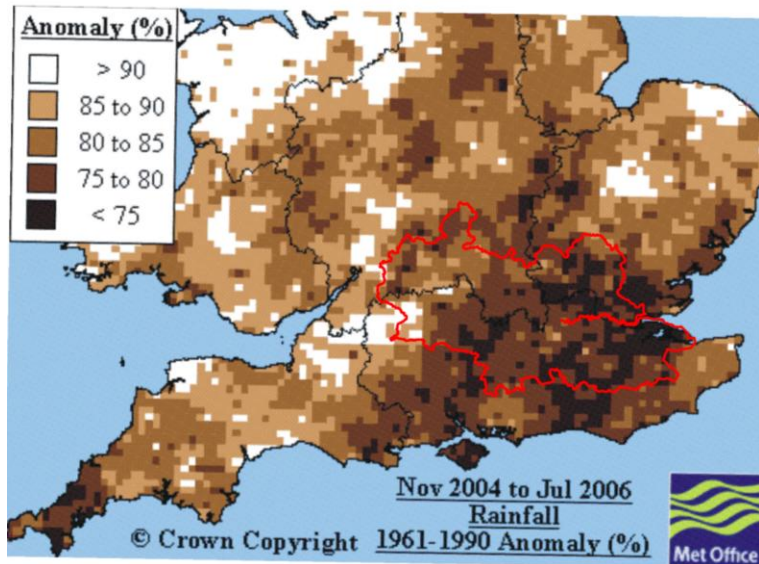


# Groundwater resources and drought research



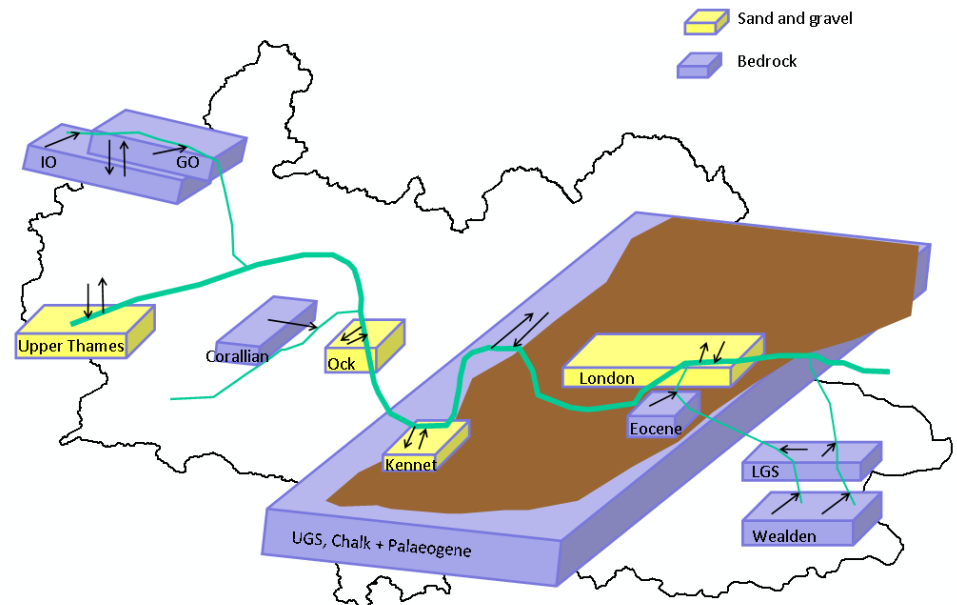
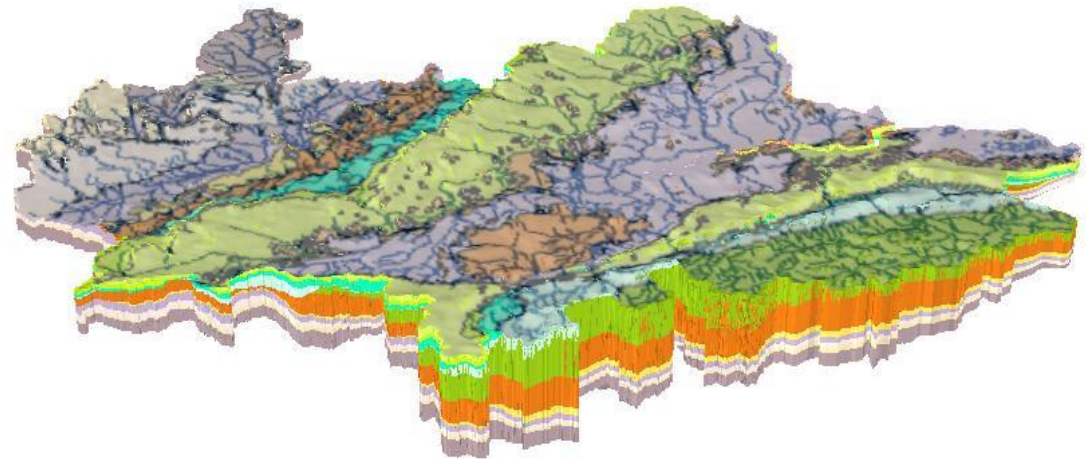
- Have we adequately characterised drought?

# Drought and whole system approaches – problems of scale and heterogeneity

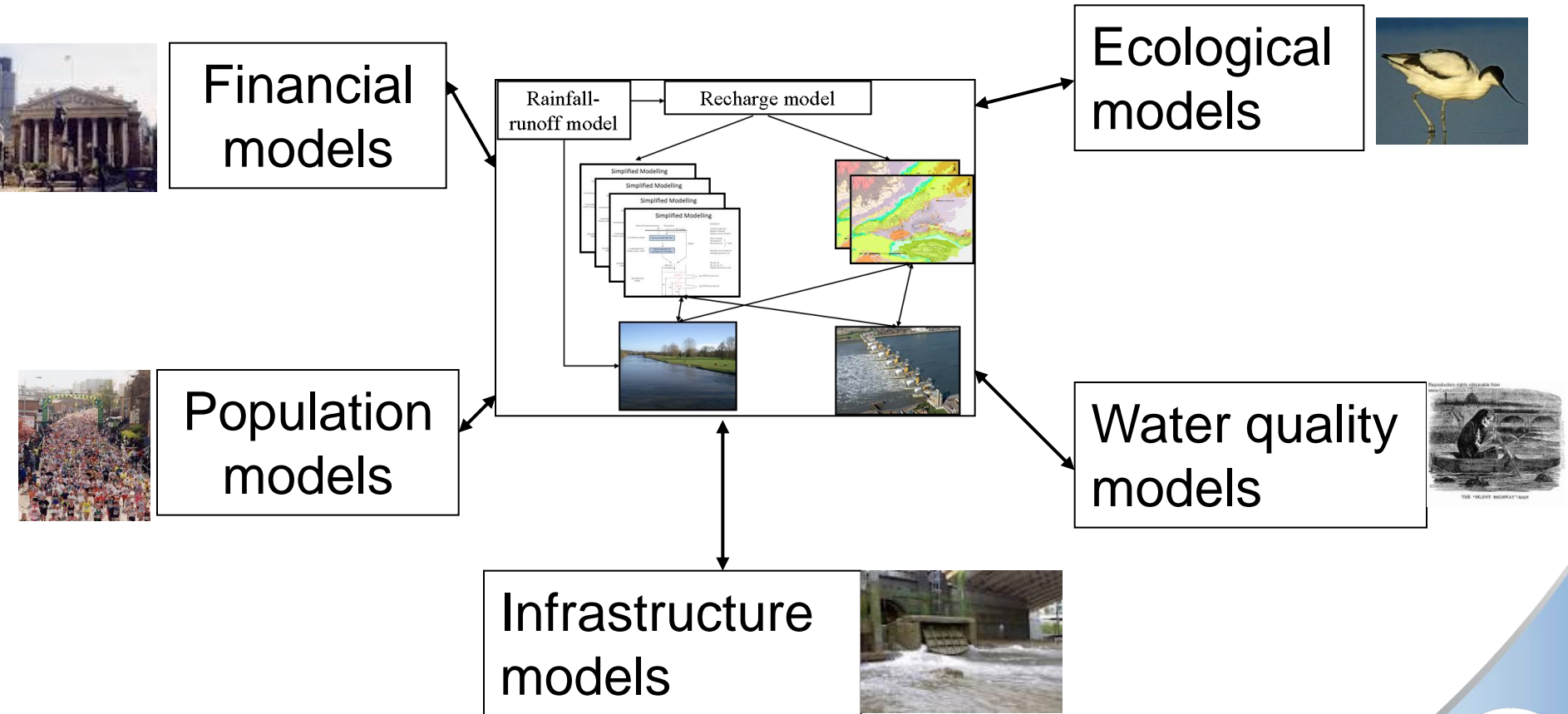


# Integration and linking

- Identifying groundwater systems from basin wide heterogeneity
- Develop different approaches based on complexity and understanding (simple vs. complex)
- Provide linkages between models of groundwater units via river and estuarine models

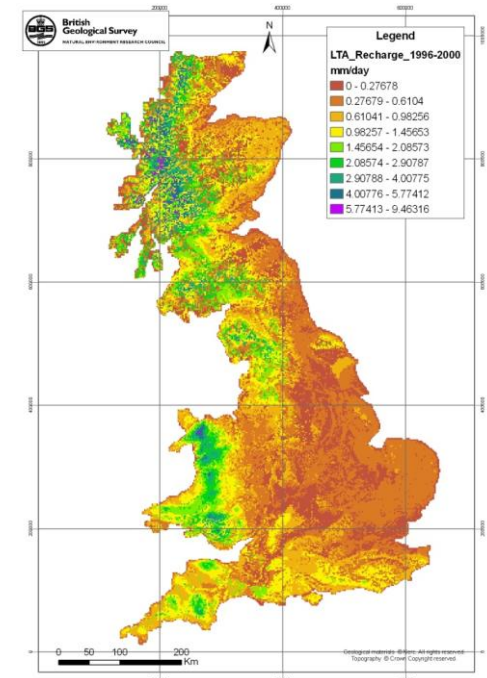
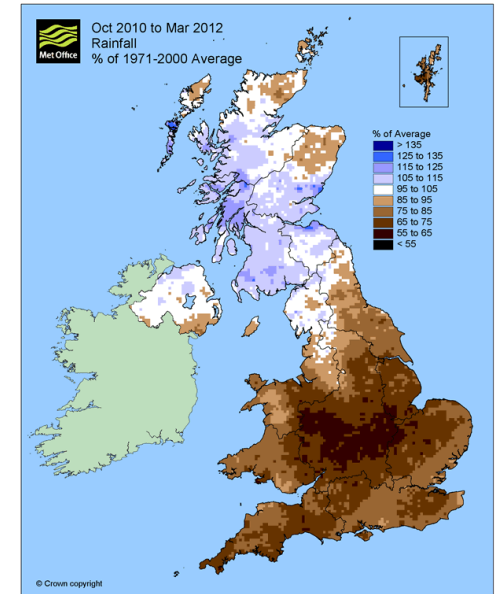
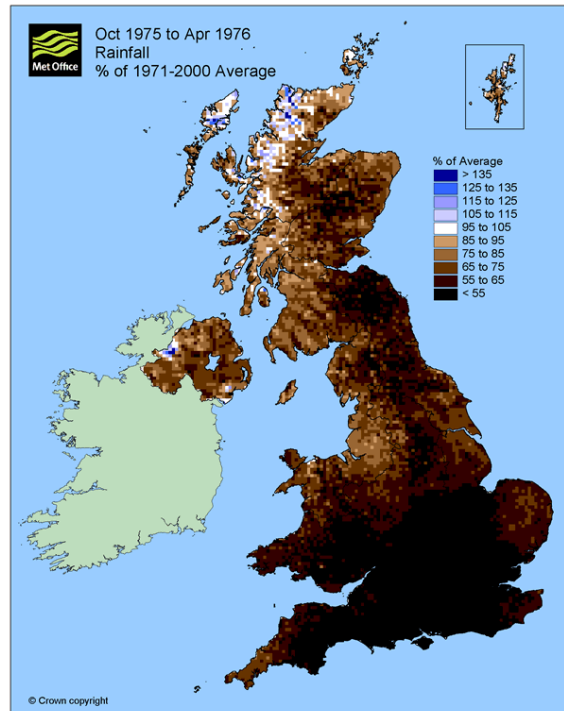
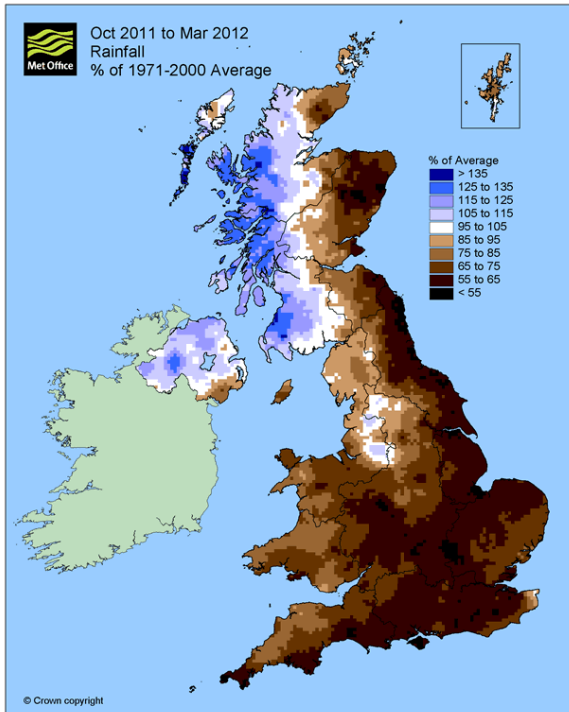


# Further linkages beyond hydrological modelling





# In UK where should we focus?



# Resilience of groundwater resources to climate change in Africa



DfID-funded project carried in partnership with ODI and UCL

**Drought in Africa or parts of Africa causes untold misery, loss of life, chronic health problems, migration, economic stagnation or decline. These are perhaps the most vulnerable**

- Objectives
  - strengthen evidence base linking climate change to aquifer resilience and livelihoods
  - collect, interpret and transform data into policy-relevant information and knowledge
  - develop evidence-based guidance to support and adaptation and resilience to climate change
- Outcomes
  - Series of quantitative groundwater maps for Africa
  - Series of case studies on aquifer properties, climate resilience, socio-economic impacts
  - Raised profile of issues

# Droughts – Issues for discussion

- What do we mean by drought?
- How feasible is seasonal prediction?
- What is our level of understand of groundwater processes and can we deal with the geographic/geological heterogeneity and scale problems/
- Where in the UK are the main problems likely to be now and in the future and where should our efforts be concentrated globally/
- Do we need a programme of Knowledge Exchange focussed at a variety of levels, government, regulators, industry and the public?

